401

EXAMINATIONS COUNCIL OF ZAMBIA

JUNIOR SECONDARY SCHOOL LEAVING EXAMINATION AND
JUNIOR SECONDARY EXTERNAL EXAMINATION

Mathematics

SPECIMEN PAPERS FOR EXAMINATIONS STARTING FROM 2020 FOR INTERNAL CANDIDATES AND FROM 2021 FOR EXTERNAL CANDIDATES

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Mathematics (401) – Preamble

Mathematics is part of the Junior Secondary School Leaving Examination taken at the end of the junior secondary school level. The Junior Secondary School Leaving Examination is based on the two-year course covering Grades 8 and 9. In 2019, the Examinations Council of Zambia undertook examination reforms which saw an introduction of School Based Assessments in all practical papers and changes in some theory papers.

During the examination reforms process, the Mathematics examination question papers were analysed. As a result, Mathematics Paper 2 has been reformed with an introduction of Sections A and B while the total number of questions has remained the same. However, **no reforms have been made in Paper 1**. Therefore, a revised Examination Syllabus has been developed with an accompanying Specimen in **Mathematics Paper 2**.

Assessment Objectives (AO)

AO1	Knowledge and Comprehension
AO2	Application
AO3	Analysis

Test Design

The Grade 9 examination will consist of two papers, **Mathematics Paper 1** (401/1) and **Mathematics Paper 2** (401/2).

Mathematics **Paper 1 (401/1)** will comprise two sections; **Section A** and **Section B**. There will be 10 multiple choice questions in Section A and 20 short answer questions in Section B. Candidates will be required to answer all questions in both sections. They will be expected to write answers only on the answer sheet provided.

Mathematics **Paper 2 (401/2)** will comprise two sections; **Section A** and **Section B**. There will be 2 compulsory questions in Section A. Section B will have 6 questions from which candidates will choose any three (3). This paper will be structured in such a way that each of the 8 questions will have various parts from different topics. Candidates will be required to show their working clearly on the spaces provided for each question. Candidates will be penalized for omitting essential working. The papers in Mathematics for both Grade 9 internal and external candidates have been summarised in the table below:

Paper/Paper Code	Duration	Marks	Percentage
Paper 1: 401/1	2 hours	50	50%
Paper 2: 401/2	2 hours	50	50%
Total		**100**	**100%**

EXAMINATIONS COUNCIL OF ZAMBIA

JUNIOR SECONDARY SCHOOL LEAVING EXAMINATION (GRADE 9) – 2020

Mathematics 401/2

Paper 2

Specimen

(INTERNAL & EXTERNAL CANDIDATES)

Reading Time: 10 Minutes **Marks: 50**

Working Time: 2 Hours

Candidate Name:...

Examination Number: ....

School/Centre:...

Instructions to candidates

1 Write your **name, examination number** and **school/centre** in the spaces provided on the question paper.

2 There are **two (2**) sections in this paper, **A** and **B**.
Section **A**: There are two questions in this section, answer both.

Section **B**: Answer any **three (3)** questions.

3 Write all your answers in the spaces provided on the question paper.

4 All essential working must be shown. Candidates will be penalized for omitting essential working.

5 Tick (✓) the questions you have attempted in Section **B** in the grid provided below.

Section	**A**		**B**						**Total marks**
Questions	1	2	3	4	5	6	7	8	
Tick	✓	✓							
Mark									

Information for candidates

Cell phones and calculators are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

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This question paper consists of 16 printed pages.

Section A [20 marks]

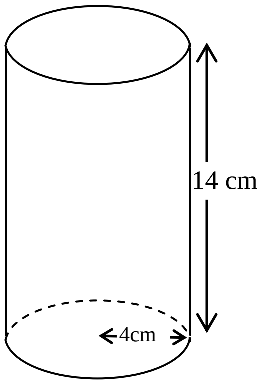
There are **two** questions in this section, answer **both**. Each question carries 10 marks.

1 **(a)** Solve the equation $10(3x - 4) = 30 - 5x$. [2]

(b) Write 25 864 in standard form correct to 3 significant figures. [2]

(c) Given that $L = \begin{pmatrix} 2 & -4 \\ -3 & 5 \end{pmatrix}$ and $M = \begin{pmatrix} 0 & -1 \\ 5 & 2 \end{pmatrix}$, find the matrix $L - 2M$. [3]

(d) The diagram below shows a cylinder with radius 4cm and height 14cm.

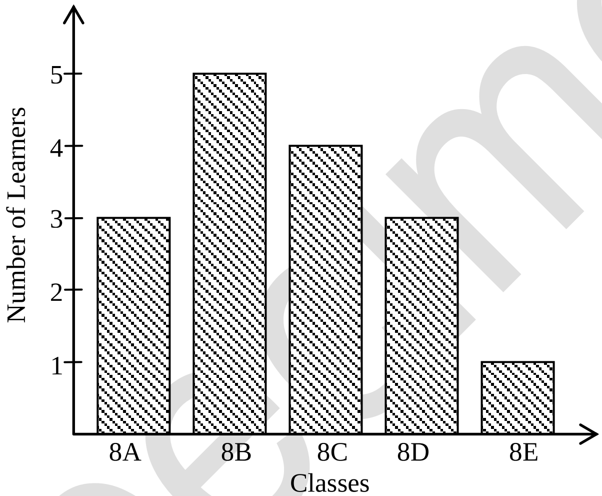


Calculate its volume. [Take π as $\frac{22}{7}$]. [3]

[Total: 10]

2 **(a)** The sum of the interior angles of a polygon is 1 440°. Calculate the number of sides of this polygon. [2]

(b) The bar chart below shows the number of learners who got distinctions in a test in each of the Grade 8 classes; A to E.



Find the

(i) modal class, [1]

(ii) total number of learners who got distinctions. [2]

(c) **(i)** Use geometrical instruments to construct triangle ABC in which AB = 8cm, BC = 7cm and angle ABC = 60°. [1]

(ii) Measure and write the length AC. [1]

(iii) Bisect the sides AB and BC. Label the point of intersection of the two bisectors with O. [2]

(iv) With centre O and radius OB, draw a circle passing through the points A, B and C. [1]

[Total: 10]

[Turn over

Section B [30 marks]

There are **six** questions in this section, answer **any three**. Each question carries 10 marks.

3 **(a)** Solve the simultaneous equations

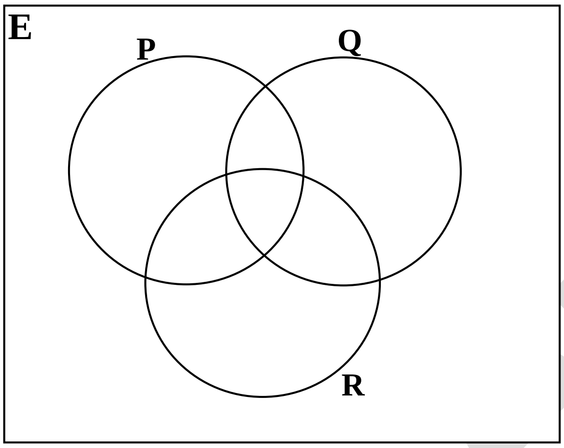
$4x + 2y = 6,$

$x - 2y = 9.$ [3]

(b) Tulo Lodge was valued at K165 000.00 on 30th April, 2018. Given that appreciation is 4% per annum, what was the value of Tulo Lodge on 30th April, 2019? [3]

(c) Given that E = {2, 4, 6, 8, 10, 12, 14, 16, 20}, P = {factors of 20}, Q = {multiples of 4} and R = {2, 6, 12, 18, 20},

(i) illustrate the information in the Venn diagram shown below, [2]



(ii) list the elements of the set (P∪Q)′∪R. [2]

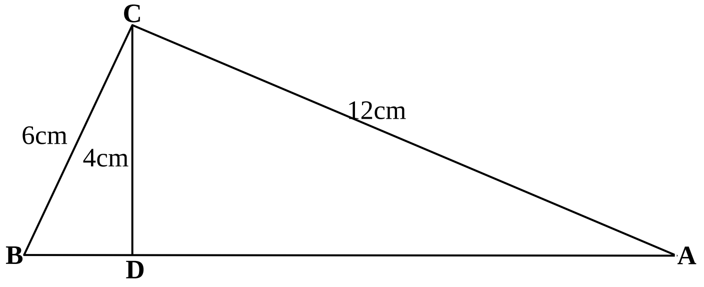
[Total: 10]

4 **(a)** Evaluate $10101_{\text{two}} \div 11_{\text{two}}$, giving your answer in base two. [2]

(b) A box contains 12 milk and 8 plain chocolate bars of the same size. If one chocolate bar is picked at random from the box, find the probability that it is plain. [2]

(c) Given that $x = \frac{3y+3}{2y}$, make y the subject of the formula. [3]

(d) In the diagram below, triangle BCD and CAD are similar.



Give that CD = 4cm, BC = 6cm and AC = 12cm, calculate the length of AD. [3]

[Total: 10]

5 **(a)** The set of ordered pairs below show the corresponding values of *x* and *y*.

(1, 3), (2, 4), (3, 5), (4, 6), (*t*, 7)

Find

(i) the function that describes the relationship between *x* and *y*, [2]

(ii) value of *t*. [2]

(b) Given three numbers represented by *a*, *b* and *c*, complete the steps below to calculate the mean (m) of the three numbers. [3]

Start

____

____

____

Stop

(c) Busiku bought a bed on hire purchase at K10 000.00. He paid a deposit of K4 000.00 and the remaining amount was paid in 6 equal monthly instalments. How much money was paid per month? [3]

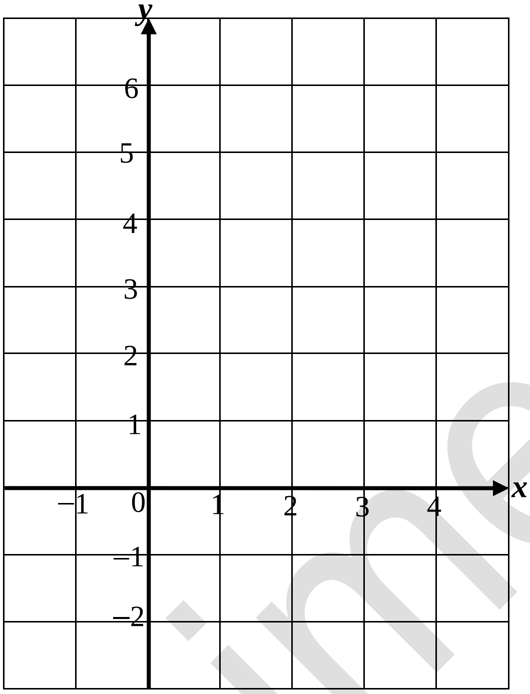
[Total: 10]

6 **(a)** Simplify $5x + 2(2x - 3y) + y$. [2]

(b) The exchange rate between the American dollar and Zambian kwacha is \$1 to K15.00. How many dollars can be exchanged for K45 000.00? [3]

(c) Given that $P = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$ and $Q = \begin{pmatrix} -3 & 4 \\ -2 & 0 \end{pmatrix}$, find matrix PQ. [2]

(d) Illustrate the solution of $y \leq 6 - 2x$ on the XOY plane shown below by shading the wanted region, for the domain $0 \leq x \leq 4$. [3]



[Total: 10]

7 **(a)** Multiply 343_{five}, by 24_{five} giving your answer in base five. [3]

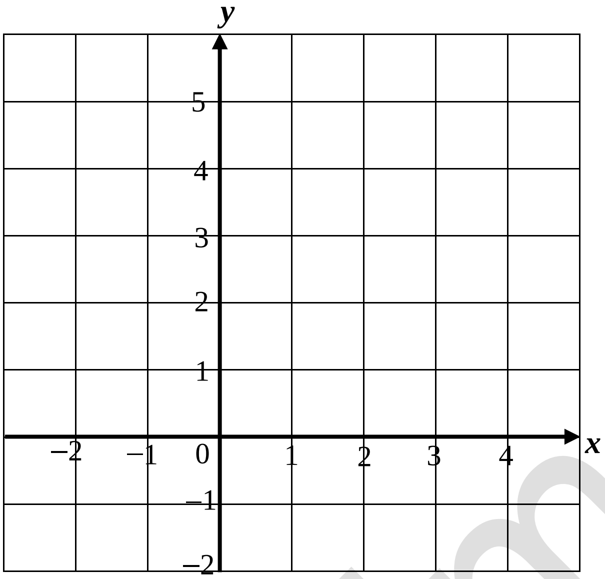
(b) A sales agent gets K10 200.00 in a month. This includes his monthly salary of K600.00 and 6% commission of the value on the sales. Find the value of the goods he sold. [3]

(c) On the XOY plane below,

(i) plot the points A(2, 0), B(4, 2), C(2, 4) and D(0, 2), [2]

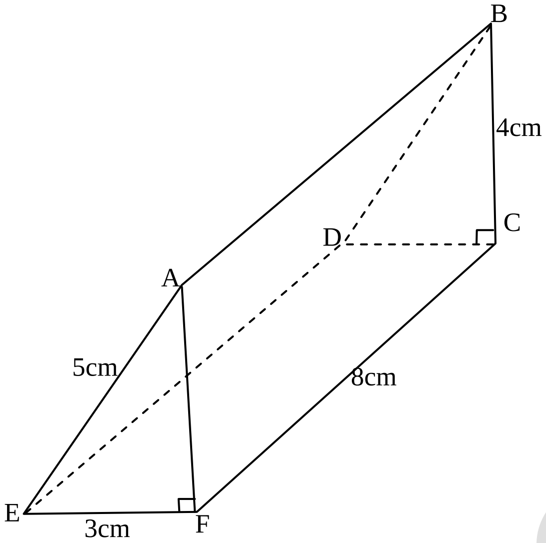
(ii) join the points to form a quadrilateral ABCD, [1]

(iii) draw the graph of y = –1. [1]



[Total: 10]

8 **(a)** The figure ABCDEF below is a triangular prism.



Given that CF = 8cm, BC = 4cm, EF = 3cm and AE = 5cm, find the surface area of the prism. [3]

(b) Gillian is paid at the rate of K*x*.00 per hour for 36 hours per week. If overtime is paid at the rate of ‘double time’, express in terms of *x*, his total wage in a week in which he worked for 42 hours. [3]

(c) The table below shows the time spent in a library by 20 Grade 5 learners on a particular day.

Time (min)	1 – 5	6 – 10	11 – 15	16 – 20	21 – 25	26 – 30
Number of learners	6	5	4	3	1	1

(i) Calculate the mean time spent in the library. [3]

(ii) How many learners spent above 15 minutes in the library? [2]

[Total: 10]